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**Srivastava Ankita**  
PG Student, Department of Oral  
Medicine & Radiology, Career  
Post Graduate Institute of  
Dental Sciences, Lucknow,  
Uttar Pradesh, India

**Agarwal Nitin**  
Professor & HOD, Department  
of Oral Medicine & Radiology,  
Career Post Graduate Institute  
of Dental Sciences, Lucknow,  
Uttar Pradesh, India

**Tiwari Aanshika**  
PG Student, Department of Oral  
Medicine & Radiology, Career  
Post Graduate Institute of  
Dental Sciences, Lucknow,  
Uttar Pradesh, India

**Chaudhary Krishankant**  
PG Student, Department of Oral  
Medicine & Radiology, Career  
Post Graduate Institute of  
Dental Sciences, Lucknow,  
Uttar Pradesh, India

**Correspondence**  
**Ankita Srivastava**  
PG Student, Department of Oral  
Medicine & Radiology,  
Career Post-Graduate Institute  
of Dental Sciences, Lucknow,  
Uttar Pradesh, India

### All about sialolithiasis – A literature review

**Srivastava Ankita, Agarwal Nitin, Tiwari Aanshika and Chaudhary Krishankant**

#### Abstract

Sialoliths are calcified structures that develop within the salivary ductal system. Researchers believe that they arise from deposition of calcium salts around a nidus of debris within the duct lumen. This debris may include mucus, bacteria, ductal epithelial cells or foreign bodies. The cause of sialolith is unclear, but their formation can be promoted by chronic sialadenitis and partial obstruction. Their development is not related to any systemic derangement in calcium and phosphorus metabolism. The following article presents a review on sialolithiasis and its clinical management.

**Keywords:** Sialolith, sialadenitis, obstruction, salivary gland, lumen

#### Introduction

Sialoliths most often develop within the ductal system of the submandibular gland; the formation of stones within the parotid gland system is distinctly less frequent. The long, tortuous, upward path of the submandibular duct and the thicker, mucoid secretions of this gland may be responsible for its greater tendency to form salivary glands, most often within the glands of the upper lip or buccal mucosa. Salivary stones can occur at almost any age, but they are most common in young and middle-aged adults.

Major gland sialoliths most frequently cause episodic pain or swelling of the affected of the affected gland, especially at mealtime. The severity of the symptoms varies, depending on the degree of obstruction and the amount of resultant backpressure produced within the gland. It the stone is located toward the terminal portion of the duct and then a hard mass may be palpated beneath the mucosa [1,2].

Sialoliths typically appear as radiopaque masses on radiographic examination. However not all stones are visible on standard radiographs. They may be discovered anywhere along the length of the duct or within the gland itself. Stones in the terminal portion of the submandibular duct are best demonstrative with occlusal radiographs. On panoramic or periphals radiographs, the calcification may appear superimposed on the mandible and care must be exercised not to confuse it with an intrabony lesion. Multiple parotid stones radiographically can mimic calcified parotid lymph nodes, such as might occurs in tuberculosis. Sialography, ultrasound and CT scan may be helpful additional imaging study of Sialoliths. Minor glands Sialoliths often are asymptomatic but may produce local swelling or tenderness of the effective glands. A small radiopacity often can be demonstrated with a soft tissue radiograph.

**Histopathologic features:** On gross examination, Sialoliths appear as hard masses that are round, oval, or cylindrical. They are typically yellow, although they may be a white or yellow-brown color. Submandibular stones tend to be larger than those of the parotid or minor glands. Sialoliths are usually solitary although occasionally two or more stones may be discovered at surgery.

Microscopically, the calcified mass exhibits concentric laminations that may surround a nidus of amorphous debris. If the associated duct also is removed, then it often demonstratives squamous, oncocytic, or mucous cell metaplastia. Periductal inflammation is also evident. The ductal obstruction frequently is associated with an acute or chronic sialadenitis of the feeding gland [3].

**Treatment and prognosis:** Small Sialoliths of the major glands sometimes can be treated conservatively by gentle massage of the gland in an effort to milk the stone toward the duct orifice. Sialagogues, moist heat, and increased fluid intake also may promote passage of the stone. Larger Sialoliths usually need to be removed surgically. If significant inflammatory damage has occurred within the feeding gland, then the gland may need to be removed. Minor gland Sialoliths are best treated by surgical removal, including the associated gland.

Shock wave lithotripsy, salivary gland endoscopy and radiologically guided basket retrieval are newer techniques that have been shown to be effective in the removal of Sialoliths from the major glands. These minimally invasive techniques have low morbidity and may preclude the necessity of gland removal [4].

**Sialadenitis:** Inflammation of the salivary glands can arise from various infections and noninfectious causes. The most common viral infection is mumps although a number of other viruses also can involve the salivary glands, including Coxsackie A, ECHO, choriomeningitis, parainfluenza and cytomegalovirus. Most bacterial infections arise as a result of ductal obstruction or decreased salivary flow, allowing retrograde spread of bacteria throughout the ductal system. Blockage of the duct can be caused by sialolithiasis, congenital strictures, or compression by an adjacent tumor. Decreased flow can result from dehydration, debilitation, or medications that inhibit secretions.

One of the more common causes of sialadenitis is recent surgery after which an acute parotitis may arise because the patient has been kept without food or fluids and has received atropine during the surgical procedure. Other medications that produce xerostomia as a side effect also can predispose patients to such an infection. Most cases of acute bacterial sialadenitis are caused by *Staphylococcus aureus*, but they also may arise from streptococci or other organisms. Noninfectious causes of salivary inflammation include Sjogren syndrome, sarcoidosis, radiation therapy and various allergens [5, 6].

**Clinical and radiographic features:** Acute bacterial sialadenitis is most common in the parotid gland and is bilateral in 10% to 25% of cases. The affected gland is swollen and painful, and the overlying skin may be warm and erythematous. An associated low-grade fever and trismus may be present. A purulent discharge often is observed from the duct orifice when the gland is massaged.

Recurrent or persistent ductal obstruction can lead to a chronic sialadenitis. Periodic swelling and pain occur within the affected gland, usually developing at mealtimes when salivary flow is stimulated. In the submandibular gland, persistent enlargement may develop which is difficult to distinguish from a true neoplasm [7]. Sialography often demonstrates sialiectasia proximal to the area of obstruction. In chronic parotitis, Stensen's duct may show a characteristic sialographic pattern known as "sausaging" which reflects a combination of dilatation plus ductal strictures from scar formation. Chronic sialadenitis also can occur in the minor glands, possible as a result of blockage of ductal flow or local trauma.

Subacute necrotizing sialadenitis is a form of salivary inflammation that occurs most commonly in teenagers and young adults. The lesion usually involves the minor salivary glands of the hard or soft palate, presenting as a painful

nodule that is covered by intact, erythematous mucosa. Unlike necrotizing sialometaplasia, the lesion does not ulcerate or slough necrotic tissue. An infectious or allergic cause has been hypothesized.

**Histopathologic features:** In patients with acute sialadenitis, accumulation of neutrophils is observed within the ductal system and acini. Chronic sialadenitis of the salivary parenchyma is lymphocytic and plasma cells. Atrophy of the acini is common. As is ductal dilatation. If associated fibrosis is present, then the term chronic sclerosing sialadenitis is used [8]. Subacute necrotizing sialadenitis is characterized by a heavy mixed inflammatory infiltrate consisting of neutrophils, lymphocytes, histiocytes, and eosinophils. There is loss of most of the acinar cells, and many of the remaining ones exhibit necrosis. The ducts tend to be atrophic and do not show hyperplasia or squamous metaplasia.

**Treatment and prognosis:** The treatment of acute sialadenitis includes appropriate antibiotic therapy and rehydration of the patient to stimulate salivary flow. Surgical drainage may be needed if there is abscess formation. Although this regimen is usually sufficient, a 20% to 50% mortality rate has been reported of the infection and sepsis [9]. The management of chronic sialadenitis depends on the severity of the condition and ranges from conservative therapy to surgical intervention. Initial management often includes antibiotics, analgesics, sialagogues, and glandular massage. Early cases that develop secondary to ductal blockage may respond to removal of the sialolith formation. Sialadenoscopy and ductal irrigation are newer techniques that can be used to dilate ductal strictures and to eliminate sialoliths and mucus plugs. Second line treatment options for chronic parotitis have included ligation of Stensen's duct, but this method has a high failure rate. Tympanic neurectomy, which results in decreased secretion by the parotid gland via transection of the parasympathetic secretory fibers at the sympathetic plexus, produces improvement in 75% of patients with chronic parotitis. If conservative methods cannot control chronic sialadenitis, then surgical removal of the affected gland may be necessary [10].

Subacute necrotizing sialadenitis is a self-limiting condition that usually resolves within 2 weeks of diagnosis without treatment.

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**Conflict of Interest:** None

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